

CHAPTER 4

A Tour of the Cell

Chapter Objectives

Opening Essay

Explain what is unique about the cellular level of biological organization.

Introduction to the Cell

- 4.1 Distinguish between magnification and resolving power.
- 4.1 Describe the two parts of cell theory.
- 4.2 Explain why there are upper and lower limits to cell size.
- 4.2 Describe the hydrophobic and hydrophilic components of a plasma membrane and relate these regions to the functions of the plasma membrane.
- 4.3 Distinguish between the structures of prokaryotic and eukaryotic cells.
- 4.4 Explain why compartmentalization is important in eukaryotic cells.
- 4.4 Compare the structures of plant and animal cells. Note the function of each cell part.
- 4.4 Describe the structures and functions of the four compartments of eukaryotic cells.

The Nucleus and Ribosomes

- 4.5 Describe the structure and functions of the nucleus and nucleolus. Explain how DNA is packaged inside of the nucleus.
- 4.6 Describe the functions of ribosomes. Explain why some ribosomes are free in the fluid of the cytoplasm while others are bound to the endoplasmic reticulum or nuclear envelope.

The Endomembrane System

- 4.7–4.12 Describe the structures and functions of the components of the endomembrane system, including smooth and rough endoplasmic reticulum, Golgi apparatus, lysosomes, vacuoles, and peroxisomes.

Energy-Converting Organelles 4.13–4.15

- 4.13–4.14 Compare the structures and functions of chloroplasts and mitochondria.
- 4.15 Describe the evidence that suggests that mitochondria and chloroplasts evolved by endosymbiosis.

The Cytoskeleton and Cell Surfaces 4.16–4.22

- 4.16 Compare the structures and functions of microfilaments, intermediate filaments, and microtubules.
- 4.17 Relate the structure of cilia and flagella to their functions.
- 4.18 Describe examples of environmental and genetic causes of infertility in men.
- 4.19 Relate the structure of the extracellular matrix to its functions.
- 4.22 Describe the four functional categories of organelles in eukaryotic cells.
- 4.22 Describe the fundamental features of all organisms.